

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT (IPER)  
AMENDMENTS**

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Perforated Form-Fill-Seal (FFS) Bag

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The invention relates to a gusseted bag according to the preamble of claim 1, a method for the production and filling of such a gusseted bag and a corresponding form-fill-seal (FFS) machine.

The generic filling of bags is carried out using the most different devices. The bag to be filled is often grasped by a plurality of pairs of gripping pliers during the filling process.

The so-called FFS machines form a sub-group within the category of filling machines. Here, the abbreviation FFS stands for **F**orm, **F**ill and **S**eal, as a result of which a special characteristic of the operation mode of these machines lies in the welding of the bags after the filling process.

Such a device is known *inter alia* from the German patent specification DE 199 36 660 A1 or from US 5,634,572. There a tube section provided with a bottom weld seam and made of thermoplastic is filled with fillers in a filling station.

These machines are superbly suitable for the rapid and cost-effective formation and filling of bags.

The bags produced by FFS machines are often filled with free-flowing goods. Also due to this reason, these bags are usually not provided with any holes or incisions. A first exception is formed by breather holes, which are usually inserted into a large part of the

outer surface of the bag. These openings are often designed such that their diameter amounts to not more than one mm in order to prevent the fillers from trickling out. Meanwhile, so-called microperforations have been developed for particularly fine fillers, wherein said microperforations comprise breather holes having diameters, which are smaller than 0.2 mm.

In recent times, there has been a necessity of providing these bags with a tear-open perforation. In this context, the term “tear-open perforation” is meant to connote a perforation made from incisions or punchings. These incisions or punchings are usually longer and/or larger than the breather holes described. Thus incisions of a length of 2 to 10 mm have proved to be useful. However, incisions having a length of 4 to 7 mm are preferred. In the wording used in this document, a single cut or a single punching, which serves for tearing open the bag subsequently, is also a perforation. Such a cut must then be inserted into the film material preferably at the edge of the bag and usually has a length, which exceeds the preferred length of the perforation cuts addressed above. A tear-open perforation serves for the simplification of the process of tearing open the bag cover. The process of tearing open the bag covering, as set forth in this document, can also involve tearing off parts of the bag cover, such as parts of the bottom seam or the head seam.

For the production and the filling of the hitherto known bags having tear-open perforations using the FFS process, the film tubes from which the related FFS machine forms the bags, are perforated by a perforation device that is not associated with the FFS machine, before the tubes are wound up again and before this tube roll is supplied to the FFS machine.

However, in the use of these bags it has been seen that the tear-open perforation forms a weak spot through which the filler trickles. So far, this disadvantage has either been put up with or such a perforation of bags has been totally omitted for fillers of a free-flowing nature.

Tear-open perforations are also known in case of bags, which contain tablet-type or pastille-type products as fillers. Such bags are known from the German patent specification DE 44 45 729 A1. Similar bags, which serve *inter alia* the packaging of foods, are known from US 5,060,803. The bags known from the two last-mentioned documents also comprise the so-called corner weld seals, in addition to the tear-open perforations.

It is therefore the object of the present invention to provide a flat bag or a gusseted bag,

- which is produced and filled by an FFS machine and
- which can be torn open easily and
- which comprises welding surfaces in the area of its corners, wherein said flat bag or gusseted bag is designed such that
- it is characterized by lower trickling losses.

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**New Claims**

1. Gusseted bag or flat bag (200,201,212,214,217),
  - which is produced and filled by an FFS machine and
  - which comprises a tear-open perforation (207,208,216) at least in the area of one of the corners of the bag,
  - wherein the bag comprises a cross-weld seal (206) in the area of at least one corner,

said gusseted bag or flat bag being **characterized in that** the forming of the tear-open perforation (207,208,216) in the area of at least one corner is changed in such a way that the perforation (207) in the interspace between the edge (209) of the bag (200,212,214,217) and the corner weld seal (206) is provided in a different manner as compared to the perforation (208) between the corner weld seal (206) and the centerline (M) of the bag (200).

2. Gusseted bag or flat bag according to claim 1,  
**characterized in that** the length or the periphery of the perforation incisions (207) in the interspace between the edge of the bag (200) and the corner weld seal (206) is larger than the length of the perforation incisions (208) between the corner weld seal (206) and the centerline (M) of the bag (200,214,217).

3. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
the length or the periphery of at least the perforation cuts (208) between the corner weld seal (206) and the centerline (M) of the bag (200,214,217) is smaller than the periphery of the grains of the fill goods of the bag (200,214,217).
4. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
the length or the periphery of at least the perforation cuts (208) between the corner weld seal (206) and the centerline (M) of the bag (200,214,217) is smaller than the diameter of the grains of the fill goods of the bag (200).
5. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
the corner weld seal (206) comprises passages (229).
6. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
the tear-open perforation (207,208,216) in the area of at least one corner is present only in the interspace between the bag edge (209) and the corner weld seal (206).
7. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
both the corners of the top (211) and/or of the bottom (210) are equipped with corner areas according to any of the preceding claims.
8. Gusseted bag or flat bag according to any of the preceding claims,  
**characterized in that**  
the perforation cuts (207,208,216) at least in the area of one corner are arranged in one line.

9. Method for the production and filling of a gusseted bag with the help of an FFS machine,

- in which the gusseted bag (200,201,212,214,217) is provided with a tear-open perforation, and
- in which the bag (200,201,212,214,217) is provided with a corner weld seal (206), said method being **characterized in that**
- the tear-open perforation (207,208,216) is inserted during the processing in the FFS machine and

that the perforation (207) in the interspace between the edge (209) of the bag (200, 212, 214, 217) and the corner weld seal (206) is provided in a different manner as compared to the perforation (208) between the corner weld seal (206) and the centerline (M) of the bag (200).

10. FFS machine for the production and filling of gusseted bags or flat bags (200,201,212,214,217), said FFS machine comprising means for applying a tear-open perforation (220,240), wherein components of the gusseted bags (200,201,212,214,217) can be provided with a tear-open perforation (220,240) using said means, while they pass through the FFS machine, said FFS machine being **characterized in that** means for applying the tear-open perforation (220,240) are provided, wherein the bags (200,201,212,214,217) can be provided using said means with perforation cuts (207,208,216), of which the length or periphery varies over the width of the bags (200,201,212,214,217).

11. FFS machine according to the preceding claim,

**characterized in that**

the means for applying the tear-open perforation (220,240) are provided, wherein the bags (200, 201, 212, 214, 217) can be provided using said means with

perforation cuts (207, 208,216), of which the length or periphery varies over the width of the bags (200,201,212,214,217).

12. FFS machine according to the preceding claim

**characterized in that**

the means for applying the tear-open perforation comprise perforation knives (252,253) or punches, whose active cutting surface or punching surface varies over the width of the bags (200,201,212,214,217) to be processed.

13. FFS machine according to the preceding claim

**characterized in that**

a perforation knife (252,253) is provided, in order to insert only one perforation cut for each sack.